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ABSTRACT

In 1960, a series of four telecasts concerning guidance, four on art, and five on science were shown in elementary and secondary schools of Toronto, Canada. Each telecast was fifteen minutes long. They were evaluated by teachers and administrators on three counts: physical aspects for viewing the telecasts, effectiveness of the television presentation, and effect on learning. Among the results of an evaluation questionnaire are: the telecast portion of each lesson had a significant effect upon learning and retention; telecast portions of lessons stimulated pupil interest and motivated expanded activities; more than one presentation of each telecast is necessary for optimum effect on learning and retention; and telecast portions of lessons should be received by one class in a regular classroom setting. An experiment on closed circuit television showed that a black-and-white telecast is as effective as a color film presentation in facilitating learning. (JK)

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#2 Study of Television as an Educational Medium, Study #1
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ED 066004

STUDY OF TELEVISION AS AN

EDUCATIONAL MEDIUM

Study No. 1

RESEARCH SERVICE

issued by the

Research Department

TEACHING AIDS

THE BOARD OF EDUCATION FOR THE CITY OF TORONTO

TABLE OF CONTENTS

Section			Page
I	SUMMARY OF THE EXPERIMENT		
	A	Experimental Design of the Telecasts.....	1
	B	Results of the Evaluation.....	3
	C	Evaluation of the Closed Circuit Experiment.....	5
	D	Conclusions.....	5
	E	Recommendations.....	6
II	PREPARATION AND DISTRIBUTION OF TELECASTS.....		7
III	INDIVIDUAL REPORTS.....		13
	Report #1 - Guidance.....		13
	A	Introduction.....	13
	B	Dimensions of the Evaluation.....	14
	C	Results of the Evaluation.....	14
	D	Overview of the Guidance Series.....	21
	Report #2 - Art.....		23
	A	Introduction.....	23
	B	Dimensions of the Evaluation.....	24
	C	Results of the Evaluation.....	24
	D	Overview of the Art Series.....	37
	Report #3 - Science.....		40
	A	Introduction.....	40
	B	Dimensions of the Evaluation.....	40
	C	Results of the Evaluation.....	41
	D	Overview of the Science Series.....	53
	Report #4 - Closed Circuit Experiment.....		57
		Introduction.....	57
		Procedure.....	58
		Methods.....	58
		Results.....	59
		Conclusions.....	59
APPENDIX I - TELEVISION STUDY ORGANIZATION.....			61

TORONTO BOARD OF EDUCATION

STUDY OF TELEVISION AS AN EDUCATIONAL MEDIUM

At a meeting on December 3, 1959, the Board approved the production of a series of experimental telecasts to evaluate the role of television as a teaching aid for the Toronto Schools. Section 7(f) of Management Report No. 17 directs as follows:

> "That a careful evaluation of the three series of broadcasts be made and that plans to accomplish this be made by the Director of Research."

The following summary of the experiment is respectfully submitted:

SUMMARY OF THE 1959-60 EXPERIMENT

A. Experimental Design of the Telecasts

1. Types of Lessons

Three subject areas were selected as the bases for the lessons, Guidance for Grade IX, Art for Grades VI-VIII, and Science for Grades III-V. Various types of lesson presentations were employed, for example, "on-the-spot" scenes, interviews, demonstrations of techniques, remedial teaching, direct instruction, illustrated lectures, and correlated activities.

The lessons in the Art Series were separate units in that each lesson was complete in itself and not related to other lessons in the series. In the Guidance Series, there was continuity, in that each lesson on "Occupations" depicted an institute of learning, or a trade or profession. The Science Series had one lesson of an individual nature, and four related lessons which constituted a unit of study from the regular Science programme.

In three of the Art lessons, children were used in the telecasts to assist the television teacher during the presentation. In the Science series, the television teacher questioned the viewing classes directly.

2. Instructional Guides

Instructional guides were prepared and distributed in advance of each telecast series to the schools involved in the experiment. The guides contained synopses of the material to be presented during the telecasts, suggestions for preparing the classes for the telecast portions of the lessons, and ideas for follow-up activities.

3. Preparation and Distribution of Telecasts

The experimental series extended over a period of thirteen weeks, commencing on January 7, 1960. The lessons were produced on film at the Teaching Aids Centre. They were transmitted through the facilities of the Canadian Broadcasting Corporation each Thursday morning, from 11:30 to 11:45. Four Guidance telecasts were presented in January, four Art telecasts in February, and five Science telecasts in March. The interval between each lesson of a series was one week.

4. Scope of the Experiment

Seventy-seven public schools and sixteen secondary schools participated in the experiment. For each school one television set was provided by the Toronto Board of Education. Some schools secured additional receivers to permit a number of classes to view the telecasts in their own classrooms. In a few instances, a special viewing room was employed where more than one class viewed the telecast on a single receiver. One hundred and eleven classes participated in the television experiment and took part in the evaluation.

5. Evaluation Procedures

All classroom teachers who received the telecasts, and members of the Administrative and Supervisory Staffs who viewed the telecasts, acted as evaluators.

The evaluation of the Experimental Series was accomplished by the following:

(a) a questionnaire was prepared to serve as the basis for a statistical analysis of the responses of the evaluators;

(b) written comments were requested to obtain opinions and judgments from the evaluators;

(c) evaluation teams were established to balance the statistical responses, and to make recommendations for future telecasting.

One hundred and seventy-one evaluation reports were received from classroom teachers, administrators and supervisory personnel.

6, Closed Circuit Experiment

In April, 1960, a scientifically controlled experiment was conducted at Riverdale Collegiate Institute involving:

(a) closed circuit transmission of the Guidance lessons on a 21-inch television screen;

(b) the film presentation of the same lessons in colour, on a projection screen.

B. Results of the Evaluation

1. Responses to the Questionnaire

(a) Physical Aspects for Viewing the Telecasts

The majority of classes viewed the telecast series on a 21-inch screen, placed at the front of the classroom, at a distance of 56"-60" from the floor to the centre of the screen. Various means of darkening the rooms were used in 80% of the classes.

20% of the evaluators reported dissatisfaction with the reception.

Timetable changes to accommodate the classes for the telecasts were reported in 80% of the responses.

20% of the evaluators indicated that the time of the telecasts (11:30 to 11:45) had an adverse effect upon pupil receptiveness. The length of time for immediate follow-up activities after the telecasts was reported to be inadequate in the Secondary and Senior Public Schools.

(b) Effectiveness of the Television Presentation

The evaluators indicated a favourable response toward the following:

(i) the introduction to the telecasts;

(ii) the manner of arousing and channelling interest;

(iii) the sequence of presentation;

(iv) the stimulation of pupil thinking.

75% of the evaluators reported that the visual materials were well chosen, and were helpful to the television presentation.

80% reported that the absence of colour on the television screen limited the effectiveness of the visual material.

20% reported that the compression of the visuals to the size of the television screen reduced effectiveness.

60% reported that the use of the camera in presenting close-up or long shots of the visual materials was excellent or good.

90% reported that the series of lessons formed the basis for work in the subject presented.

(c) Effect on Learning

90% of the evaluators reported that the use of the telecasts was effective in assisting later recall of information.

80% indicated that the novelty of classroom television had an effect on the rate of learning of the pupils.

2. Written Comments

All evaluation sheets indicated that the students and classroom teachers had expanded upon the concepts presented during the telecasts by reference and research work, supplementary reading, visits to the Art Gallery and Museum, special projects, group discussions and other varied activities.

Difficulties were reported in seating arrangements, posture, eye-strain and pupil fatigue during the telecasts when lessons were viewed by more than one class in a regular classroom, or in a large viewing room. Such problems were rarely reported where one class viewed the telecasts in its own classroom setting, and where the television receiver provided satisfactory visual-sound reception.

Opinion was divided relative to the effect on learning caused by the absence of the two-way process in the television presentation.

50% of the evaluators reported that learning suffered through the inability of the students to ask questions during the telecast.

50% of the evaluators reported that this loss could be reduced by adequate class preparation and follow-up.

3. Reports of Evaluation Committees

The Evaluation Committees gave confirmation and extensive documentation to the findings on the questionnaire. Many opinions were expressed regarding the use of television as an educational medium. A complete summary of the deliberations of the Committees is contained in the full report.

C. Evaluation of the Closed Circuit Experiment

A statistical analysis of objective test scores obtained by pupils viewing the Guidance lessons in black and white on a 21-inch television screen and by pupils viewing the same lessons in colour on a projection screen indicated as follows:

(i) no significant differences in quantity of learning between the film and TV groups;

(ii) no significant differences in retention between the film and TV groups;

(iii) no significant differences in the development of attitudes between the film and TV groups;

(iv) significant differences in retention between groups that had two visual presentations and those who had only one visual presentation;

(v) that the pupils who viewed the telecasts in January, 1960 retained in April, 1960, 77% as much as the TV group, 76% as much as the film group and 68% as much as the groups which had two visual presentations.

D. Conclusions

1. The telecast portion of each lesson had a significant effect upon learning and retention. For the Guidance lessons, results were accomplished equal to the same films projected in colour on a regular movie screen.
2. Telecast portions of lessons stimulated pupil interest and motivated expanded activities.
3. For optimum effect upon learning and retention, more than one presentation of each telecast is necessary.
4. Telecast portions of lessons should be received by one class in a regular classroom setting.
5. The success of this series of telecasts merits further investigations of the possible uses of this medium in education.

E. Recommendations

1. That scientific experimentation in telecasting be undertaken by the Toronto Board of Education, and that funds be included in the 1961 Estimates for the provision of accommodation, equipment, and staff.
2. That the Canadian Broadcasting Corporation and the private television station undergoing construction, be approached by officials of the Board relative to the provision of satisfactory time for the Toronto Board of Education telecasts.
3. That there be an extension of telecast production by the Teaching Aids Centre.
4. That, for future telecast purposes, one television receiver, of good quality, and possessing a 21-inch hooded screen, be provided for each school building and that adjustable, movable stands for the television receivers be made available.

SECTION II - PREPARATION AND DISTRIBUTION OF TELECASTS

The experiment being reported constitutes an interesting milestone in the development of educational television in Canada, since it marks the first occasion on which a local educational authority has undertaken the complete production of a series of school telecasts to be transmitted by the CBC. Previous work in this field has been done co-operatively, but the actual production processes have heretofore been carried on in the CBC's studios.

By special arrangements between the Teaching Aids Centre and the CBC's School Broadcasts Department, and with the approval of the National Advisory Council on School Broadcasting, the full series of thirteen fifteen-minute programmes was produced entirely within the facilities located at the Centre, and passed over to the CBC in the form of thirteen films specifically made for telecasting purposes.

The studio at the Teaching Aids Centre measures 17 feet by 19 feet. It is equipped with one sound camera. The exigencies of scheduling made it necessary to use the "single system" method of filming. This means that the sound is recorded photographically at the same time and on the same film as the picture.

It was decided to produce each programme on film, using motion picture equipment, for the following reasons:

1. Since participants inexperienced in telecasting were to be used, some form of delayed broadcasting seemed to be the only sure way to preclude the possibility of breakdown.

2. The facility afforded by the adoption of film techniques, especially the feasibility of producing the programme in small sections, permitted a reduction in rehearsal time and a lessening of tension on the part of the performers.

3. Filming in advance is a recognized medium for the storage and delayed broadcast of television programme material; this system gives a quality of reproduction that is much superior to kinescoping, albeit somewhat inferior to videotape or live production. Most important in this instance, no actual television equipment is needed to produce a technically satisfactory product for later broadcasting — or, for that matter, for use as a film if so desired.

4. The Teaching Aids Centre already had the equipment necessary for producing motion pictures, but did not have access to a videotape recorder nor to the television camera chains required to feed videotape recording facilities.

As things turned out, the adoption of film as the storage medium for the present experiment proved to be a most feasible method of meeting the conflicting demands of time, space, budget and schedules.

Each programme in the series went through the following stages of development:

1. Preparation of materials and selection of cast
2. Rehearsal
3. Shooting
4. Processing
5. Editing
6. Screening for approval of CBC officials
7. Broadcasting
8. Storage for possible future use

Every effort was made to ensure that each lesson met the standards of the CBC, the Teaching Aids Centre, and the teachers of Guidance, Art and Science. The division of responsibility set up in an attempt to reach this level of achievement was as follows:

1. The CBC provided time on the air and transmission facilities; in addition CBC representatives sat in on the screening of each programme in advance of the broadcast and passed final judgment on it from the standpoint of programme content and technical treatment. The representatives from the CBC were: Mr. R. S. Lambert, Mr. T. V. Dobson, and Mr. Monty Fotheringham, all of the School Broadcasts Department. Before the production of the programmes was begun, the technical quality of films previously produced at the Teaching Aids Centre had been checked and pronounced satisfactory by Mr. Rodger Ross and Mr. Harold Wright of the CBC's technical staff.

2. The Teaching Aids Centre participated in the planning of the programmes, as well as providing the staff, equipment, and facilities for rehearsing, shooting, and editing of each of the programmes. Most of the accompanying printed materials were duplicated at the Centre, and the distribution of these materials to the schools was also the Centre's responsibility. Members of the Centre's staff primarily responsible

for the various aspects of production were: Mr. C. E. Freestone (co-ordination, direction, lighting, and photography); Miss Moira Armour (titling, sound recording, editing); Mr. Neil Nelson (lighting assistant, sound recording, editing); Miss Helen Magee (duplicating and mailing).

3. The decision to include Guidance, Art and Science as the three subject areas to be tried out in the present experiment was made by the Programming Sub-Committee, the members of which are listed in Appendix I.

4. Responsibility for the evaluation of the three series included in the present experiment devolved upon Dr. A. R. MacKinnon, Director of Research for the Toronto Board of Education, and the members of the Research and Evaluation Sub-Committee, whose membership is given in Appendix I.

5. This experimental series of telecasts form one part of a comprehensive plan, initiated by the Director of Education, to investigate the place which educational television should occupy in the Toronto school system. The complete organization involved is given in Appendix I.

The broadcast time offered by the CBC was 11:30 to 11:45 each Thursday morning. The fifteen-minute length chosen for the television part of the lesson seemed to be advisable because of the fact that it would make possible -- even essential -- some preliminary work by the classroom teacher as well as some immediate follow-up. In this way it was hoped that television would come to the classroom as an aid to each teacher, designed to present material that the individual teacher would find difficult if not impossible to bring into the classroom.

It should be pointed out that the fifteen-minute programme fits nicely into the customary forty-minute period, giving about ten minutes for assembling the class and introducing the lesson, fifteen minutes for the televised segment, and ten to fifteen minutes for immediate follow-up and arranging assignments for future activity by the students.

In order to meet the broadcast requirements set up by the CBC, each programme had to be cut in the editing stage to exactly 520 feet, giving a running time of 14 minutes and 25 seconds. On occasions, this necessitated cuts that eliminated good material or that were not conducive to a smooth flow of programme material or to the professional quality of the editing.

Various methods were employed to obtain the film footage needed for each programme. For example, in the programme dealing with the Provincial Institute of Trades, a considerable amount of material was shot without sound on location by Mr. Freestone and Mr. Nelson. The sound was added later at the Centre. Some of the footage for the programme dealing with the University came from a film previously produced by a commercial organization for the University of Toronto. Similar footage was incorporated into the programme dealing with occupational opportunities afforded by the hospitals. The rest of the footage required was shot with synchronized sound in the Centre's studio.

The processing of the exposed film was done commercially. Colour film was used, rather than black and white film, partly because the single system sound track has proved to be consistently of good quality and partly because the possession of a colour original makes it possible to produce duplicate prints either in colour or in black and white. It had been found by actual tests on CBC telecine equipment that the colour original transmitted very well.

Editing the film on its return from processing proved to be a major item in the production routine, both from the standpoint of the amount of time consumed in the process and in the amount of care that had to be exercised. Some idea as to the amount of time required for the editing of the films will be provided by the following totals as recorded by the two members of the Centre's staff who did this work:

Time taken by Miss Armour for editing the
Guidance, Art and Science programmes - 133 hours
Time taken for editing Guidance, Art and
Science programmes by Mr. Nelson - 113 hours
Total time for editing thirteen programmes - 246 hours

The work of preparation, rehearsal, shooting and editing was done out of the regular working hours of the persons involved. This was done partly to keep to a minimum any interruption of the classroom work of the participants, and also to make it possible for the normal work of the Teaching Aids Centre to continue concurrently with the additional load imposed by the television experiment. Needless to say, this procedure could not be adopted if production were to be put on a continuous basis.

Since television is still in an experimental stage in the Toronto school system, it was decided to rent receivers at a cost for the thirteen-week period of forty dollars per receiver. In order to involve as many schools as possible, only one receiver was provided by the Board to each school, and only if the principal expressed his willingness to participate in the experiment.

In the instructions distributed before the experiment started, the stipulation was made that the receiver was to be installed in a selected classroom, and that only one class was to view a given series. Unfortunately some exceptions to this ruling occurred, and viewing took place in locations other than regular classrooms.

It was not possible to examine each receiving location from the standpoint of signal strength and consequent quality of picture and sound. Since the usual "rabbit ears" type of indoor antenna was provided with each rented set, it is inevitable that reception would vary from school to school.

The direct costs involved in the production and reception of the programmes can be listed with some degree of accuracy, and are shown in the following table.

TABLE I

PRODUCTION COSTS OF SERIES

	Guidance	Art	Science
Rental of receivers	400.00 (Secondary Schools only)	930.00 (Public Schools only)	930.00
Overtime use of the Centre	500.00	750.00	400.00
Salaries of television teacher and Teaching Aids Centre staff	840.00	1250.00	450.00
Material Costs -			
Original film	500.00	625.00	520.00
Magnetic sound track	125.00	160.00	135.00
Optical sound negative and dupe print	30.00		
Film inserts	125.00		15.00
Graphics	5.00	10.00	25.00
Costume rental		34.00	
Miscellaneous (photo lamps, reels and tins, printed materials, titling materials, etc.)	120.00	125.00	100.00
Total cost for programmes	$ 2645.00	$ 3884.00	$ 2575.00
Average cost per programme	$ 661.25	$ 971.00	$ 515.00

The indirect costs are quite incalculable. Thousands of hours of work were put into the project by members of the Centre's staff who either were not paid extra, or whose actual overtime far exceeded the amount allotted; by members of the committees involved; by participants in the programmes who volunteered their services; and by others who will have to be content with the satisfaction that comes to the experimenter. Similarly, the contribution made by the CBC cannot be calculated accurately, although its importance cannot be overestimated.

SECTION III - INDIVIDUAL REPORTS

REPORT # 1 - GUIDANCE

A. Introduction

Four programmes, each fifteen minutes in length, comprised the first series in the Toronto experiment. The series was concerned with Guidance and covered a wide range of occupations. The programmes were entitled:

(1) The Provincial Institute of Trades
(2) The Ryerson Institute of Technology
(3) The Hospital Team
(4) Path to University

A committee consisting of four heads of Guidance Departments and the Chairman of the Programming Sub-Committee selected the topics, planned the individual programmes, and prepared the accompanying material. Members of this committee were: Mr. J. Hermon Couke (Chairman), Mr. J. Herbert Stewart, Mrs. Eileen M. Gladman, Mr. Ralph H. Lewis, Dr. Cecil J. Wilkins.

The major part of the responsibility with respect to co-ordination, script writing, and narration of each programme was delegated to Mr. Herbert Stewart.

Various methods were employed to obtain the film footage needed for each programme. For example, in the programme dealing with the Provincial Institute of Trades, a considerable amount of material was shot without sound on location by Mr. Freestone and Mr. Nelson. The sound was added later at the Centre. Some of the footage for the programme dealing with the University came from a film previously produced by a commercial organization for the University of Toronto. Similar footage was incorporated into the programme dealing with occupational opportunities afforded by the hospitals. The remaining footage required for each programme was shot with synchronized sound in the Centre's studio.

Sixteen Secondary Schools took part and six of them supplied their own receivers. The principals of some schools obtained additional receivers by special arrangement with neighbouring dealers or by borrowing sets from members of the staff or from parents.

B. Dimensions of the Evaluation

Three dimensions of the series were given close scrutiny. These included Physical Aspects of Reception, Pedagogy of Presentation, and Effects on Learning.

To assist in the overall evaluation, an Evaluation Sheet was compiled. It consisted of 34 items, all of the multiple-choice type. However, only 9 items were used to elicit specific information, and 25 items to obtain some judgments, either subjective or objective, from the evaluators. Space was provided for elaboration in all but two of the items. In addition to the 34 items, further information regarding the telecasts was invited through eight questions of a general nature, and one item marked "Other Comments".

The Guidance Series was evaluated by 10 Classroom Teachers, 13 Principals or Vice-Principals, 6 Heads of Departments, and 2 Superintendents. Although it was intended that only one class view each telecast, in a normal classroom situation, some adjustments had to be made, and, in a number of instances, two classes viewed the telecasts in one classroom. In all, evaluation sheets were received from 31 evaluators.

As a means of obtaining further data regarding the telecast series and to check on the statistical replies of the evaluators, a committee composed of heads of Guidance Departments was established. A summary of their discussions is included in this report under the heading, "Report of Special Committee".

C. Results of the Evaluation

1. Responses to the Questionnaire

(a) Physical Aspects of Viewing

In this experiment the physical aspects of the viewing conditions in a normal classroom situation were of major concern, conditions that would be conducive to pupil rapport and receptiveness, conditions that would require a minimum of movement and rearrangement, and other factors that could disturb the viewing.

Twenty-seven respondents indicated that the television receiver had been placed so that its centre was 56" to 60" from the floor. Nineteen viewers noted that the front centre of the room had been selected for the location of the television receiver, while 9 viewers reported that the television set had been placed at the front of the room near the corridor wall. The majority of the classrooms used a 21-inch television screen. In almost all cases, the rooms had to be darkened to facilitate viewing.

The evaluators were generally satisfied with the clarity of the pictures, and the audibility of sound reception. There were 18 reports, however, that the quality of the reception was occasionally impaired by poor set performance, or outside interference. It must be noted, at this point, that no outside antennae were used; "rabbit ears" had to suffice.

Some concern was indicated insofar as time table changes were involved. Some re-arrangement of schedules was reported by 28 of the evaluators. Although it had been felt that the time of day might have some effect upon pupil receptiveness, the evaluation failed to bear this out, for only in 6 responses was it felt that the late morning telecast affected the receptiveness of the pupils for the telecasts.

In this study the amount of time allowed for immediate follow-up activities, after the telecast, appeared questionable. While 14 responses indicated that sufficient time had been allowed, 17 reported that the time allowed for immediate follow-up activities was inadequate.

(b) Pedagogy of the Presentation

It was indicated by 24 respondents that the introductions to the lessons effectively aroused pupil interest and that the goals of the lessons were made known to the pupil. Twenty-five evaluators indicated that the speed of talking and the choice of language on the part of the television teacher were satisfactory. Of 31 replies, 20 indicated that the rate of introducing new ideas and information was satisfactory. Only 2 evaluators stated that the length of the telecast was too short, but 29 considered the length satisfactory. Twenty-seven respondents stated that the weekly interval between the lessons of the series was satisfactory. Only 17 evaluators felt that the sequence of presentation within a telecast was clear, and only 20 thought that pupil thinking was stimulated.

The use of the visual materials brought mixed responses from the evaluators. Only 14 evaluators considered that the choice of the visual material was good, and 17 thought it fair. Nineteen evaluators felt that the correlation between the choice of the visual material, and the ideas presented through words, was good.

From the more technical aspects of the production, the evaluators were divided as to the extent the lack of colour on the television screen limited the effect of the visual material; 12 felt that there was a significant difference, 12 noted a limited effect, and 7 indicated a significant loss. Again, only 14 evaluators felt that the cameras had

done a good job in presenting close-up or remote views, while 17 felt that this work was only fair. Almost everyone felt that some loss resulted from the compression of the visual material to the size of the television screen.

(c) Effect on Learning

Only 6 evaluators said that the telecasts were used as a basis for work in that subject during the period of the telecast series, 19 reported that the telecasts were used to a limited degree, and 6 stated that the telecasts did not form the basis for the work in the subject. Only 17 believed that television would be effective in assisting the later recall of the information, 3 thought that it would be very effective, but 11 felt that it would be of little use. Twenty evaluators indicated that the novelty of this type of presentation had some effect upon the rate of learning, but 11 evaluators indicated that there was little or no effect.

One question was used to ascertain what problems in discipline were evident during a telecast. To this question, 20 reported no significant difficulties, but 11 noted wandering attention. Whether the presence of visitors had an effect upon the class, or whether wandering attention could be attributed to the level of the class, could not be ascertained.

(d) Summation of Written Comments

As part of the questionnaire, 8 areas of concern were specified to obtain discussion regarding the telecast lessons. The replies to the questionnaire were such that an exact statistical tabulation could not be made. However, a common pattern of opinions, suggestions and recommendations emerged from the responses. These are enumerated as follows with the original questions stated in each case:

Question 1: "INDICATE IDEAS OR MATERIALS PRESENTED DURING THE TELECASTS WHICH COULD NOT ORDINARILY HAVE BEEN PRESENTED IN A REGULAR CLASSROOM LESSON."

Specific mention was made of the value of "on the spot" demonstrations, tours through institutions, illustrations of work being done, actual operations in trade schools and interviews with professional people in the various occupations.

One comment was made that this provided, "feelings of the people actually in the field". The "on the scene" shots of occupations seemed to strengthen word ideas. A criticism was made that the portrayals were too short and under-developed. The students viewing the telecasts were learning through both ears and eyes, but their questions and answers at appropriate times were missing.

Question 2: "INDICATE ASPECTS OF THE VISUAL MATERIALS, OR THEIR USES, WHICH TENDED TO DISTRACT PUPILS FROM THE PRESENTATION."

Twenty-five per cent of the evaluators said that no distractions were apparent. However, others claimed that charts were often confusing, too small and not readable; there was a lack of smooth transition from scene to scene; resulting in the changes being too rapid, and causing awkward gaps; cameras were not always focused on the person speaking and often moved away from the speaker at random. Some distraction was reported because of the musical background. This occurred in one of the commercially-produced film inserts.

Question 3: "INDICATE WAYS BY WHICH THE CLASSROOM TEACHER EXPANDED ON THE LESSONS BEYOND THOSE DEVELOPED IN THE TELECASTS."

Responses in this area indicated that a wide variety of follow-up activities took place, e.g. discussions, study of monographs, calendars, books, and explanations. The only difficulty in carrying through a more extensive expansion was that the telecast times conflicted with the regular time tables.

Question 4: "INDICATE MEANS BY WHICH PUPILS SOUGHT OUT ADDITIONAL INFORMATION RELATED TO THE TOPICS PRESENTED IN THE TELECASTS."

Students viewing the telecast appeared to be quite well motivated. This was indicated by the student's desire to find further information about the subject material of the television lessons through teacher conferences, borrowing of material, and through securing information from Ryerson Institute, the Superintendent of Education and the Guidance Department.

Question 5: "IF INSTRUCTIONAL GUIDES, ETC., HAD BEEN SENT OUT PREVIOUS TO THE TELECAST SERIES, INDICATE."

(a) "THEIR EFFECTIVENESS IN PREPARING THE PUPILS FOR THE LESSONS."

Most of the evaluators found the instructional guides very effective, particularly in the first 25% of the period. Since television provides only a "one shot" opportunity to gather the necessary information,

the instructional guides were effective in that they directed the attention of the students towards specific goals.

A comment was expressed that at times the approach was too technical to the point where pupils lost interest.

(b) "THEIR EFFECTIVENESS IN PLANNING FOLLOW-UP ACTIVITIES."

The general feeling of the evaluators seemed to be that the instructional guides were valuable especially when the lessons fitted in with the particular needs of the pupils.

(c) "HOW THESE GUIDES, ETC., MAY HAVE BEEN IMPROVED."

Most thought the guides were adequate, but could be made less technical. A suggestion was made that binders for use of all Grade 9 students would be helpful to keep the material together. There was one suggestion, too, that student committees might have assisted in the preparation of the instructional guides.

Question 6: (a) "INDICATE DIFFICULTIES ENCOUNTERED BY THE CLASS RELATIVE TO THE SATISFACTORY VIEWING OF TELECAST LESSONS, E.G., SEATING ARRANGEMENTS, POSTURE, EYE-STRAIN, PUPIL FATIGUE, ETC."

Fifty per cent of the evaluators stated that there were no real difficulties especially where there was movable furniture in the room.

(b) "INDICATE MEANS BY WHICH THE DIFFICULTIES MIGHT HAVE BEEN OVERCOME."

It was generally felt that whatever difficulties had been encountered relative to the satisfactory viewing could have been overcome had movable furniture been present in all of the viewing classrooms.

Question 7: "INDICATE YOUR VIEWS RELATIVE TO THE GENERAL VALUE OF T.V. IN COMPARISON WITH WHAT COULD HAVE BEEN DONE WITH A SIMILAR EXPENDITURE OF MONEY AND TIME, E.G. SUBJECT CONSULTANTS, FILM LIBRARIES, BOOKS AND MATERIALS FOR CLASSROOM USE, ETC."

The distribution of films through the telecast provided opportunities for a wide number of classes to view the films simultaneously. Seventy-five per cent of the evaluators reported that more flexibility in the programme could have been obtained if these films had been available in the schools for use when the teacher required them in a regular programme. One suggestion was made that Subject Consultants and film libraries would be more helpful. Important advantages of films used in the telecasts were that they were of local origin and were up-to-date.

Question 8: "IN YOUR VIEW, WHAT EFFECTS ARE THERE ON LEARNING AS A RESULT OF THE ABSENCE OF THE TWO-WAY PROCESS IN THE TELECAST PRESENTATION."

It was generally felt that the absence of the two-way process would be serious without adequate preparation and follow-up. The view was expressed that emphasis through repetition and exchange of ideas was lacking. This often resulted in passivity on the pupils' part.

Question 9: "OTHER COMMENTS."

The following comments emerged from this section of the evaluation form:

(a) The success stories were exaggerated insofar as the viewing classes were concerned.

(b) Undue stress was placed on pre-apprenticeship training at the Provincial Institute of Trades to the exclusion of the Toronto Technical Schools.

(c) Since the series was sponsored by the Toronto Board of Education the students involved in the telecasts should have been products of the Toronto School System.

(d) The field covered in the telecast was often too narrow. For example, the university students interviewed were all from the Arts Faculties.

2. Report of Special Committee

(a) Physical Aspects of Viewing

It was the consensus of the group that a 21-inch television screen at an approximate height of 60 inches from the floor was most suitable for classroom viewing. The group felt that the room in which the telecasts were viewed should have movable furniture since this provides for various seating arrangements for the pupils.

The group suggested that the telecasts were best viewed by one class in a regular classroom setting. Any viewing groups larger than a normal class (35 pupils) would destroy the essential characteristic of pupil-teacher communication. In viewing a telecast, participation (writing notes, etc.) on the part of the pupils would seem desirable; hence some type of illumination should be present in the room. Most schools in the present study employed some form of darkening the room. Selection of a room for viewing should take into account the possibility of illumination on one side. The suggestion was made that a hooded screen might be valuable.

The group felt, however, that more experimental study should be made on the most appropriate position of the television set and procedures for obtaining adequate illumination for making notes.

Some difficulty was experienced in selecting the class which was to view the series. The group felt that if television was to be used more extensively, one set should be provided for each room. Opinion was expressed that if a set is not immediately available, teachers will not employ telecasts in their programmes.

Considerable disruption was experienced in re-arranging the timetable to provide for the telecasts. The particular time selected for these telecasts precluded immediate follow-up, often encroached on other subjects and allowed little time for pupil preparation. The group suggested that announcements of telecasts should be made well in advance so that adequate planning could be made for the lessons, and a suitable time set in the timetable. It was suggested that telecasts might be arranged for the first period in the morning. The telecast period might start at approximately 9:05, it would coincide with most home room periods, and make fewer disruptions in the regular programme.

The group felt that the length of programme was quite adequate and did fit in quite well with the lessons.

(b) Suggestions Regarding Pedagogy

Notes sent out prior to the telecasts were considered to be excellent.

There was a general view that for the average class little was gained from the telecasts. Most of these classes evinced a lack of enthusiasm. One criticism made of the content of the programme was that too much was attempted and this resulted in pupils missing some of the essential points which they should have learned. Most value seemed to be gained through the pupils seeing persons like themselves actually engaged in various jobs. The telecasts tended to have too much adult talk. The general design of the programme appeared to be satisfactory, but the purposes of the telecasts were often obscure. What was attempted might just as well have been done through facilities already available to the guidance teacher. The suggestion was made that the telecasts might have taken up fields of work which were outside the immediate reach of guidance teachers. For example, for one week a telecast on mining with actual "on the spot"

pictures of young miners at work would have been helpful. The group emphasized, however, that such programmes should not be mere travelogues or Social Studies lessons, but should relate very clearly to possible careers and even part-time summer work. The group also emphasized that the occupations presented should be placed within their proper perspective of scholarship and reality. Thus, if you work hard at school and obtain a particular standard or certificate then opportunities increase for professional standing. Even professional work is filled with a considerable measure of drudgery, and this should be noted.

(c) Suggested Aims of Educational Television

The group felt that from the point of view of a guidance programme, the only really suitable area for telecasts is in the field of occupations. Personal relations are of the utmost importance for such other aspects as self-orientation and job-orientation.

The group felt that further experimentation is required before television can become an effective educational medium. To this end the group suggested that the advantages of closed circuit T.V. should be explored as a way of pre-assessing the telecasts before effecting wider distribution.

Design of the programmes should aim continuously at greater participation on the pupils' part. Television would also seem to have an important part to play in adult education, particularly through in-service programmes for teachers. The group felt that it might be used to supplement general experience. The final view was given that some programmes might be designed for after school use so that an enrichment to the regular programme might be accomplished to offset the puerile entertainment now being offered.

D. OVERVIEW OF THE GUIDANCE SERIES

The series of telecasts on guidance were produced in a very short period of time and with no clear-cut model to follow in telecast production. The evaluation questionnaires and the outcomes of the special committee discussions indicated that the four programmes had generally served a quite useful role as a teaching aid on the topic of "occupations".

Many specific suggestions for improvement of future telecasts were contained in the replies on the questionnaire and in the deliberation of the special committee. A number of these suggestion which pertain to

television as an educational medium require further experimentation and further confirmation on the two other series before action should be taken to implement the findings. The results as determined through replies on the questionnaire and through opinions of members of the special committee were essentially subjective in nature. The opinions of teachers, Principals or Vice-Principals, Heads of Departments and Superintendents are exceedingly valuable, but it cannot be assumed that their views adequately assess the effects on learning of those pupils who viewed the telecasts.

As a means of obtaining more objective results, a closed circuit study using the films from the guidance series was initiated on April 25th, 1960 at Riverdale Collegiate Institute. A full report on this experiment is given in Report No. 4 - Closed Circuit Experiment.

REPORT # 2 - ART

A. Introduction

The series of four fifteen-minute telecasts in Art, designed for use in Grades VI to VIII was produced under much the same conditions as the programmes for the Guidance series.

Each of the four Art programmes was produced in the Centre's studio under the supervision of Mr. Howard Dierlam, Director of Art. Mr. Dierlam prepared a very complete and well-illustrated shooting script of each programme; he selected the television teachers and the pupils who took part; he rounded up the properties that were to be used; he prepared any backdrops that were required. Hundreds of hours were spent by him away from the Centre, and in addition he took an active part in the actual filming, although he did not appear in front of the camera.

A different teacher was used for each programme. In keeping with Mr. Dierlam's philosophy of art instruction, pupils were used on each programme except one. Here is a list of the programmes, together with the names of the teachers who conducted each lesson:

1. Drawing and Painting Portraits
   - Miss Phyllis Edmondson, Art Instructor, Givins Senior Public School
2. Meet the Artists - Portrait Appreciation
   - Miss Lucy McMurray, Art Instructor, Art Gallery of Toronto
3. Pioneer Life - Motivation for Picture Making
   - Mrs. Virna Flood, Art Instructor, Jesse Ketchum Senior Public School
4. Print Making by the Silk Screen Process
   - Mr. Wm. A. Hogg, Art Instructor, Essex Senior Public School

Mr. Hermon Couke, Chairman of the Programming Sub-Committee, took an active part in the preliminary planning of the series. Mr. Charles Comfort, now head of the National Gallery, took part in the programme "Meet the Artists", while Mr. Colucci, Director of the Edgeley "Pioneer" Village took part in the programme on Pioneer Life. Several students from Givins Senior Public School spent many hours under the hot studio lights, patiently going over each scene until it was considered to be satisfactory.

B. Dimensions of the Evaluation

In presenting the Art Series as part of the experiment in Educational Telecasting, two areas of concern were considered. These included the value of television as an instructional medium, and the place of Art as a subject for telecasting. To assist in this evaluation, three dimensions of the medium were examined, namely, the physical aspects of the reception, the pedagogy of the presentation, and the effects upon the learning of the students.

To provide the necessary data for the evaluation, an Evaluation Sheet, consisting of 34 multiple-choice items, was compiled. While only 9 of these items were used to elicit specific information re the classroom situation, 25 items were designed to gather opinions relative to the presentation, pedagogy, and effects on learning. In all but 2 of the items, space was provided for the Evaluators to specify any matters which pertained to their choice. Eight additional questions listed as "General Comments", and one listed as "Other Comments", were included with the Evaluation Sheet to procure further information not covered in the multiple-choice items.

The Art Series was evaluated by several different groups of people. In addition to the 43 classroom teachers who participated in the experiment, evaluation sheets were received from 14 Principals and/or Vice-Principals, 13 Supervisors and/or Consultants, and 1 person designated as "other". In all, 71 evaluation sheets were returned.

In order to secure further information re the telecast series, to check on the statistical responses of the evaluators, and to make definite recommendations and suggestions for future telecasting, two special committees were established. These included one from the Principals' Association and one from the Consultants' Organization. A summary of the findings of these two Committees will be found in this Report, under the heading "Report of Special Committees".

C. Results of the Evaluation

1. Responses to the Questionnaire

(a) Physical Aspects of Viewing

Of vital importance in this experiment were the physical aspects of the viewing classes, the grades and levels of the pupils, the numbers viewing the telecasts in any one viewing room, the location of the screen, and the ease of viewing. Also, the amount of movement and re-arrangement

of pupils and classes, and other factors which might affect pupils receptiveness and rapport, were of major concern.

An examination of the 71 evaluation sheets revealed some very pertinent information. Of the grades participating, 31 evaluators noted Grade VI, 21 reported Grade VII and 19 indicated Grade VIII. The majority of the classes were considered to be "average". The number of pupils in the viewing classes ranged from 21 - 30, to 81 - 90. However, the majority of the classes had from 21 - 40 pupils.

The location of the television receiver in the classroom varied greatly. The distance from the floor to the centre of the screen ranged all the way from 25" - 30", to 81" - 90". However, in the majority of the classes, the distance from the floor to the centre of the screen was 46" to 60". It generally appeared that this height of the screen was most satisfactory.

The placing of the receiver differed too, among the classes. Thirty-two respondents noted that the set was placed in the front-centre of the room, 26 reported the set at the front of the room near the window, and 7 indicated that the set had been placed at the front of the room near the corridor wall. Six evaluators listed "other" as the location of the receiver in the rooms, and these included rear of room, side of room, etc.

Some difference in the size of the television screens was reported. The largest group of evaluators (50) noted that a 21-inch screen was used, and 15 reported that a 17-inch screen was used. However, in some classes, there was a 24-inch screen, as indicated by 6 evaluators. In view of the fact that 50 evaluators, out of the 71, considered the size of the screen to be adequate, it must be gathered that the 21-inch screen, or anything larger, was most satisfactory and adequate.

Reporting upon the extent to which the room had to be darkened, 60 evaluators indicated that blinds, shades, etc., had to be used in order to facilitate the viewing, but the other 11 evaluators noted that no reduction was made in the normal lighting of the room.

The evaluators were generally in agreement that the audibility of the sound was satisfactory, for only 5 persons considered it otherwise due to outside interference, and 2 blamed poor set performance for the inadequacy of the sound.

Some concern was felt by the evaluators relative to the clarity of the picture on the screen. Only 47 evaluators felt that it was satisfactory, while the other 24, equally divided, placed the blame for poor video reception upon outside interference and set performance.

From the standpoint of school routine, one factor was very significant; some 58 evaluators (82%) reported that a change in timetable was necessary to accommodate the classes for the telecasts.

Relative to the time of day of the telecasts, and its effects upon pupil receptiveness, 59 evaluators felt that the 11:30 a.m. period had no noticeable effect, but 12 felt that some effect was evident. In this connection, too, 31 felt that adequate time was allowed after the telecasts for immediate follow-up activities, but 40 considered that insufficient time was allowed. It is quite likely that, in the Senior Schools, where the lunch period commences at a time earlier than 12:00 noon, the 11:30 telecast affected pupil receptiveness and limited the time for immediate follow-up activities.

(b) Pedagogy of the Presentation

Some difficulty was encountered in evaluating the pedagogy of the presentation, since each lesson in the Art Series was designed as an experiment in the various types of art lessons that could be offered via television. Thus, the responses of the evaluators must be considered as an overall percentage view of the whole series, while items directed towards specific lessons, or parts of lessons, must be left for the "General Comments".

The evaluators appeared to be satisfied with the introductions to the lessons, and the channelling of pupil interest for 90% of the responses indicated that pupil interest was effectively aroused, and that the goals of the lessons were made known to the pupils. Only 7 evaluators differed from this point of view. For the sequence of the presentation, some 83% of the evaluators felt that it was clear to the pupils, but 17% considered it to be doubtful. Seventy-three per cent of the evaluators felt that there was a moderate amount of pupil thinking, while 10% felt that pupil thinking was greatly stimulated. Only 17% thought that there was little stimulation of pupil thinking.

It was reported by 90% of the evaluators that the speed of talking of the television teacher was satisfactory, and 94% felt that the choice of language was satisfactory, too. Fifty-six evaluators (80%)

thought that the new material and information were presented at a satisfactory rate, 14 persons (19%) thought that the material was presented too quickly, and 1 respondent thought that it was presented too slowly.

Considering the length of the telecasts in relation to the attention span of the pupils, 80% of the evaluators felt that the telecasts were of satisfactory length, and 20% felt that the lessons were too short. Eighty-four per cent of the respondents thought, too, that the weekly interval between the individual lessons of the series was quite satisfactory, but only 6% felt that the interval was too long, and 10% considered it to be too short.

The use of the visual materials, and the competency of the cameras in recording this material brought mixed reactions from the evaluators. Only 20% considered the effectiveness of the visual material to be excellent, but 52% reported it to be good, and 28% indicated that, in their opinion, it was fair. Again 21% of the evaluators felt the effectiveness of the correlation between the visual materials and the ideas expressed through words was excellent, 62% considered it to be good, and only 17% listed it as fair. Thirty-nine per cent of the evaluators were of the opinion that the lack of colour on the television screen significantly limited the effect of the visual material, 38% felt that there was a limited effect, and 23% felt that there was no significant effect. Half of the 71 evaluators regarded the use of cameras in presenting close-up or remote shots of the materials to be good, 36% thought it fair, and 14% considered it as excellent. Only 11% of the viewers did not think that the compression of the visual material to the size of a television screen significantly limited its effectiveness, but 49% thought that it did to some degree, and 40% felt that it did so significantly.

(c) Effect on Learning

Slightly more than half of the evaluators felt that the series of lessons could form the basis for further work in that subject (Art) to a high degree during the period of the series, and 40% felt that it could accomplish this purpose to a limited extent. Sixty-seven per cent of the reporting group sensed that the series was effective in assisting later recall of the information, 18% felt that it was very effective, but 15% thought that the telecasts were of little effect in this respect. Replies also revealed that some evaluators (18%) considered that the novelty of this type of presentation markedly affected the rate of learning, that 62%

felt that the novelty had some effect, but 20% felt that the novelty of this type of presentation had no significant effect upon the rate of learning.

Insofar as problems in discipline in the classroom were concerned, 20% of the replies indicated that some restlessness was apparent, 30% noted a wandering of attention, 4% referred to pupils distracting other pupils, and 46% noted "other" problems in discipline. However, there is no way of ascertaining to what extent, if any, the television was responsible for these problems. They might well have been isolated cases, or problems generally found in those particular classes.

(d) Summation of Written Comments

In order to procure additional specific information and personal views from the evaluators, eight questions were appended to the questionnaire. Although the replies were such that they could not form part of the statistical tabulation, they did contain a common pattern of thought, suggestions, and recommendations. These are given as follows, prefaced by the original question in each case:

Question 1: "INDICATE IDEAS OR MATERIALS PRESENTED DURING THE TELECAST WHICH COULD NOT ORDINARILY HAVE BEEN PRESENTED IN A REGULAR CLASSROOM LESSON."

There was almost unanimous opinion among the evaluators (95%) that the authentic materials used in the telecasts, the costumes, models, exhibits, silkscreen process, etc., and the presence of Mr. Comfort himself, and his paintings, added much to child motivation, and could not have been achieved or assembled in the average classroom situation.

In view of the newspaper publicity concerning Mr. Comfort, and the National Art Gallery, his presence during the telecast was most timely. It was also pointed out that, seeing a famous artist, and hearing him discuss his paintings, was most inspiring, from the pupil point of view.

Some of the evaluators (7) welcomed the lesson on portrait painting, and felt that it was invaluable in having an expert, or specialist teacher point out errors, and show the pupils how to correct these errors and improve the portraits. It was generally conceded by these evaluators that few classroom teachers could do this work adequately.

Question 2: "INDICATE ASPECTS OF THE VISUAL MATERIALS, OR THEIR USES, WHICH TENDED TO DISTRACT PUPILS FROM THE PRESENTATION."

About 14% of the evaluators found no aspects of the visual materials, or their uses, which tended to distract the pupils. However, the

remainder of the evaluators found the compression of the visual material to the size of the screen, the lack of colour, poor black and white contrast, and poor projection to be distracting. Criticism was levelled in 4 replies against the stilted dialogue of the television teacher and the participating students, and the distracting actions and voices of these students. All these factors, plus time lapses in camera changes and television teachers' comments created restlessness, and distracted children from the presentation.

Question 3: "INDICATE WAYS BY WHICH THE CLASSROOM TEACHER EXPANDED ON THE LESSONS BEYOND THOSE DEVELOPED IN THE TELECASTS."

The variety of means used by the teachers and pupils to expand upon the lesson material was indicated throughout the evaluation reports. The lesson on "Portrait Painting" was followed by further practice, and expanded activities involving front and side views, cartooning, and so on. This lesson, and the one involving Mr. Comfort, led to visits to the Art Gallery, the study of artists and their work, and the study of prints found in many of the library books. The telecast on Pioneer Life resulted in visits to the Museum, and research projects on the costumes, tools, and way of life of the early settlers. The demonstration of the silk screen process brought about further work in this activity through the making of more elaborate frames, and more difficult designs.

Question 4: "INDICATE MEANS BY WHICH PUPILS SOUGHT OUT ADDITIONAL INFORMATION RELATED TO THE TOPICS PRESENTED IN THE TELECASTS."

It was indicated by every evaluator that the children needed little further motivation, beyond the telecasts, to seek out additional information. The use of books from the school and public libraries, individual visits to the Art Gallery and Museum, class discussions, and home activities in silk-screening were all evidence of the pupil interest as a result of the telecast.

Question 5: "IF INSTRUCTIONAL GUIDES, ETC. HAD BEEN SENT OUT PREVIOUS TO THE TELECAST SERIES, INDICATE."

(a) "THEIR EFFECTIVENESS IN PREPARING THE PUPILS FOR THE LESSONS."

Everyone felt that the instructional guides sent out were helpful, to a greater or lesser degree, in preparing the pupils for the telecasts. The introductory remarks seemed to be most beneficial, although some comments were made that more detail could have been provided in the guides.

(b) "THEIR EFFECTIVENESS IN PLANNING FOLLOW-UP ACTIVITIES."

The majority of the evaluators seemed to feel that only in the telecast on Pioneer Life were the guide sheets effective in planning follow-up activities. But even in these guide sheets, more detail would have been appreciated.

(c) "HOW THESE GUIDES, ETC., MAY HAVE BEEN IMPROVED."

Some suggestions were made that the guide sheets should have contained more ideas for follow-up activities.

Question 6: (a) "INDICATE DIFFICULTIES ENCOUNTERED BY THE CLASS RELATIVE TO THE SATISFACTORY VIEWING OF TELECAST LESSONS, E.G. SEATING ARRANGEMENT, POSTURE, EYE STRAIN, PUPIL FATIGUE, ETC."

About one-third of the evaluators noted no difficulties in this respect. However, the others generally found fault with the amount of glare on the picture, the size of the screen, the size of the seats, and the distance between some students and the television receiver. It was also noted that too many pupils in the classroom created viewing difficulties.

(b) "INDICATE MEANS BY WHICH THE DIFFICULTIES MIGHT HAVE BEEN OVERCOME."

It was felt that the difficulties noted above could have been overcome had a larger, hooded screen been used. A plea was made for movable posture furniture, particularly where the children viewed the telecasts in the art classrooms, and had to sit on the art stools.

Question 7: "INDICATE YOUR VIEWS RELATIVE TO THE GENERAL VALUE OF T.V. IN COMPARISON WITH WHAT COULD HAVE BEEN DONE WITH A SIMILAR EXPENDITURE OF MONEY AND TIME, E.G. SUBJECT CONSULTANTS, FILM LIBRARIES, BOOKS AND MATERIALS FOR CLASSROOM USE, ETC."

Sixteen of the evaluators felt that a film, particularly in colour, would have been better, since films could be shown when and where necessary, stopped, reversed, reshown, previewed, etc. It was felt by one person that much would have been gained had children been told that the lesson was a "film", and not a "pseudo-live" presentation. Criticism was made that the telecast lessons lacked the flexibility needed for a sound teaching programme since the lessons could be shown once, and once only, regardless of the needs of some students.

Nine replies noted that the programmes were well planned, and a good stimulant to the students. The novelty of the television presentation was well worth the effort, and a decided step forward.

Two comments indicated that subject consultants were of greater value than television, in that the latter failed to provide the necessary inspiration, and nine comments favoured the spending of money on literary books and reference materials.

Question 8: "IN YOUR VIEW, WHAT EFFECTS ARE THERE IN LEARNING AS THE RESULT OF THE ABSENCE OF THE TWO WAY PROCESS IN THE TELECAST PRESENTATION."

Some of the evaluators (10) felt that the absence of the two way process had little effect on learning, in such a short telecast, and since the classroom teacher was present to help the children during the follow-up part of the lesson. It was pointed out by four evaluators that the two way process is not as vital here, as in other subject areas.

A number of the evaluators (10) felt that the inability of the students to participate, and ask questions led to distraction and disinterest, particularly among the children of lower ability. Three of the evaluators stated that, since the classroom teachers did not know the details of the lessons, and the material to be presented, they were unable to prepare themselves sufficiently well, and hence could not answer questions raised by the pupils.

It was pointed out by some individual evaluators (5) that learning through television is not based upon firm foundations. Their comments indicated that when too many facts are presented in any one lesson, the classroom teacher is unable to ascertain what concepts are understood by the children. As pupils are not involved in the lessons, only superficial learning results. Television can thus become so overpowering that the pupils could assume a mental passivity of acceptance as the lesson deteriorates into a telling process, rather than a thought-stimulating experience.

Mention was made in 2 cases that only the interested students were stimulated by the telecasts, and gained from them. However, for the majority of students, having too much television at home leads them to take the medium for granted, and results in day-dreaming during the classroom telecasts. This day-dreaming can go undetected by the classroom teachers.

Question 9: "OTHER COMMENTS."

The following points were raised by the evaluators:

(a) As yet, television appears to have little to offer that cannot be obtained equally well and much more conveniently from films. It does have possibilities of being an excellent medium for keeping teaching personnel informed on modern educational theories, new techniques, etc.

(b) The use of non-professional performers suffers in comparison with the regular television personnel whom the children are accustomed to watching.

(c) This method of presentation might become effective in such subjects as science, health, and social studies.

(d) The timing of the telecasts was very bad, and would be most limiting in a school having a rotary system.

(e) It is regrettable that since films were shown, anything but superior ones were used. Since some 57% of the film shot on professional studies is used in a film strip, it is quite conceivable that four worthwhile films could be produced with the time and equipment available.

(f) The presence of Mr. Comfort, and the interview with him, were beyond the level of the Grade 6 students.

2. Report of Special Committees

(a) Principals' Association

This Evaluation Committee felt that the reception of the telecasts, from the point of view of audio and video clarity, was quite adequate, although in many cases, some difficulty was encountered due to both outside interference and mechanical failure. To overcome these difficulties in the future the group recommended that television receivers of better quality be used, and that better indoor antennae be provided.

Some concern was felt by the Group relative to the many problems faced by the teachers in setting up the receiver and the classes for the telecast. Many adjustments were needed, the set had to be moved from place to place to overcome light reflection and shadows, and the absence of electrical outlets limited the possible locations of the receiver. The group also pointed out that, for the telecasts, either classes or the receivers, had to be moved great distances, at considerable inconvenience. This was harmful to the set, and did little towards encouraging proper rapport and receptiveness on the part of the viewing classes.

It was the general feeling of the members of this committee that, to overcome these difficulties, a special viewing room, with the television receiver permanently established, be provided. However, since this is not possible at the moment, the group felt that, under the present conditions of accommodation, metal stands, adjustable in height, and on casters be used. The metal stand could serve as an antenna while the casters would facilitate the moving of the set from room to room. Also, by equipping the receiver with a hood, the problem of light and shadows would be overcome, and the need for darkening the classroom would be eliminated. It was also pointed out that, to provide for adequate preparation and follow-up activities, the telecasts be scheduled within a forty-minute time period, and at a time earlier than 11:30 a.m.

It was recommended, that, for future experiments in educational telecasting, one television receiver per floor per school building be provided.

It was pointed out by the Group that, in the Senior Schools, adequate time for follow-up activities was lacking, since most schools dismiss for lunch at a time earlier than 12:00 noon, and the telecasts commenced at 11:30 a.m., as mentioned earlier. Furthermore, since a class might have its Art period only once a week, there would be no time for follow-up for one whole week, and, at that time, a new lesson in the series would be forth coming.

The Group thought that, to overcome these problems, the lessons be received much earlier than 11:30 a.m., and that they be spaced at intervals of approximately four weeks. It was recommended that the C.B.C. be approached regarding the possibility of reviewing and revising its programme schedule to overcome these difficulties, and also to avoid the conflict in time between the school radio broadcasts and telecasts.

Opinions differed within the group relative to the use of children on the television screen. Strong criticism was made that these children become distractors through their unmodulated voices, and that the parrot-like answers given by children lend a stilted, unnatural air to the lesson. On the positive side, it was felt that by having children on the screen, some advantage would be gained in that they could serve as an example to the shy children in the classes. The only point of agreement was that children would be necessary in a lesson showing progressive or remedial teaching.

While no actual criticisms of the lessons, the lesson presentations, or the formats were forthcoming from this group, it was suggested that in the one lesson on silkscreening, too much material was presented for the length of time of the telecast.

All members of the Group felt that television has much to offer, and its possibilities should be explored further. Comments of the individual members indicated that television can present material, demonstrations, and techniques which would be impossible in many of the classrooms, that it could provide on-the-spot and up-to-date records of people and events, and that its presentation would remain fresh in the minds of the pupils. Everyone agreed that the rapport between the pupils and the television teacher is better than it is between the pupils and film narrators. To this end, it was suggested that the use of classroom teachers, specially trained in television techniques, be continued.

Some concern was felt, among the members of this Committee, relative to the amount of disruption in routines faced by the schools which provided teaching personnel and pupils for the telecasts. It was suggested for future telecast lessons, that some thought be given to the problems of transporting pupils to and from the studio, of supplying occasional teachers when and where necessary, and of making more convenient adjustments in the school timetables, if possible.

All the members of this Committee felt that there was a place, in telecasting for Art lessons. However, it was pointed out that these lessons would be of greater benefit if the classroom teachers were to know well in advance, the date, the time, and the content of each lesson. To this end, it was suggested that lesson plans, or guide sheets, containing the topics, materials, and ideas for preparation and follow-up activities be produced as early in the year as possible, and forwarded to the teachers. Thus, the classroom teachers, knowing what to expect from each of these telecasts, would be able to programme her year's activities according to these telecasts, and use them as motivational, review, demonstration, or enrichment lessons, at her own discretion. It was even suggested that teachers be given an opportunity to preview the telecasts, before these programmes are presented to the classes.

In conclusion, it was the considered opinion of this committee "that television has much to offer in the field of education, and that this experimental series should provide thoughtful criticism and suggestions that would be valuable in future attempts".

(b) Consultants' Organization

(i) Physical Aspects of Viewing

It was the general feeling of the group that too much time was lost in the first few minutes of the telecasts in locating the set properly, adjusting the antenna and tuning dials, and rearranging the seating for the class. Thus, it was recommended that an introductory period immediately preceding the telecasts be provided during which time the necessary preparations could be undertaken.

While it was admitted that the screen, placed so that its centre was 56 inches from the floor was adequate, some alteration was necessitated by the age of the students, and the size and type of furniture. To overcome this problem, to facilitate viewing, and to remove possible eye strain and physical fatigue, it was suggested that the television sets be placed on stands which could be adjusted as to height.

Some criticism was raised relative to the interruptions during the telecasts, caused by bells ringing, announcements over the public address system, and messengers appearing at the door of the classrooms. However, no recommendation to overcome these difficulties was made by the group.

It was recommended that only one class at a time view a telecast, in a normal classroom situation, and that, as an experiment, two television sets be provided per viewing class, and that the overall effect of having two receivers in the classroom be evaluated.

(ii) Basic Aims of Lessons

It was the consensus of the group that the basic aim of television is not to provide a whole course, or even part of a course. Teaching courses via television would result in regimentation of programmes of studies, disregard for individual differences among the pupils, and stilted performances on the part of the classroom teachers. It was felt that the lessons in any particular subject, given via television, be spaced, approximately one month apart, and that the lessons be so designed that a teacher could use them at her own discretion as they meet the needs of the class. These lessons could encompass motivation, presentation, demonstration, culmination, review, or enrichment, or a combination of one or more of these activities.

To assist the teachers in planning their programmes with the telecasts in mind, it would be necessary for the classroom teachers to know well in advance the dates, and content of each lesson, and suggestions for preparatory and follow-up activities. Thus, the group recommended that this

information be distributed to the classroom teachers as early in the school year as possible, and that, within a week preceding the actual telecast, provision be made for the classroom teachers to preview the telecast.

It was also pointed out by the group that, in designing instructional guides in a subject like Art, it be borne in mind that the amount of detail would be greater for the non-specialist teachers, than it would be for the art specialists.

This group recommended too, that, in addition to the classroom teachers having an opportunity to preview the telecasts, some provision be made for the telecasts to be re-shown, as a means of the classes reviewing the material.

It was the feeling of the group that the first few seconds of the lessons are of the greatest importance, in that the impact upon the viewers would affect the degree of pupil receptiveness throughout the whole lesson. It was also pointed out that the placing of the material would have to be considerably slower than it is on commercial films, in order to allow the children to digest the facts presented. In this connection, the group recommended that more questions be asked, by the television teacher, and that each question be followed by a time lapse of even a few seconds, to allow the pupils to work out the answers in their minds. This would bring in pupil participation.

Some concern was shown relative to the use of pupils on the screen. There was unanimous opinion that children on the screen could be distracting, and therefore should be used as little as possible, and only when absolutely necessary in lessons involving remedial work.

All the members of this evaluation committee felt that the impact on learning, on both the pupils' and teachers' parts, was great. It met certain needs for the teachers, and enlarged the frame of reference for the pupils. However, it was felt that the greatest loss came through the inability of teachers and pupils to carry out immediate follow-up activities.

This group of Consultants did not feel that the novelty of television in the classroom had any significant effect upon the learning. However, it was the opinion of the group that, in classrooms where the pupils had been exposed to films and film strips as part of their learning, much more was gained from the telecasts than was gained by pupils who had little in the way of films and film strips previously.

One final recommendation of this group stated that lessons should be directed to one particular grade level, and not to several grades.

D. Overview of the Art Series

The Art Series, like the Guidance Series, was planned and produced within a minimum amount of time and space, with no clear-cut pattern to follow. However, in the Art Series, rather than having the series consist of a number of topics embracing a unit, four individual lessons were presented, each utilizing a different approach to television teaching. These included a lesson on portrait drawing, and the necessary remedial teaching involved, an interview with a famous artist and discussion of his work, an integration lesson between Art and Social Studies, based on pioneer life, and a demonstration of print making by the silkscreen process.

The statistical responses of the evaluators, and the comments of the two evaluation committees all indicated that much had been gained from these telecasts by both the teachers and the pupils. It was felt that these lessons could not have been presented by the average classroom teacher in a regular classroom setting. Pupils and teachers were highly stimulated to go well beyond the confines of the classroom to gather further and additional material to supplement the telecasts and round out the programmes. Thus, two dimensions of televised instruction had been achieved, and the telecasts fulfilled a very real purpose.

From the standpoint of the physical aspects for viewing the telecasts, strong criticism was made of the many distracting influences which tended to disturb the pupil receptiveness, and break down the necessary rapport. It was the considered opinion of the two evaluating committees, and the majority of the evaluators that, for future telecasts, due consideration be given to ways of eliminating these difficulties, and making the conditions for viewing more satisfactory. To this end, it was recommended that television receivers of better quality be provided, that they be equipped with hoods, and that these receivers be placed on adjustable, movable stands. It was also recommended that one television receiver per school building, exclusive of "portables", be provided.

The greatest amount of criticism in the telecast series was directed against the timing of the telecasts. Many of the Senior Schools in Toronto have their lunch periods commencing at 11:45 a.m., and, for these schools the possibility of immediate follow-up activities was eliminated. In the other schools, which dismiss at 12 o'clock noon, and prepare for dismissal at 11:55, insufficient time was allowed for effective follow-up activities after the telecasts. As adequate time for immediate

follow-up activities is vital insofar as impact on learning is concerned, one can well accept the grounds upon which this criticism was based. It was strongly urged that, for future telecasts, the televised portions of the lessons commence at a time considerably earlier than 11:30.

General satisfaction was found with the length of each telecast lesson, and the amount of new material presented in each lesson. There was, however, a body of opinion that indicated that some attempt be made in these lessons to stimulate pupil thinking through the use of questions and that the final minute or two of the telecast be used by the television teacher to summarize the material presented during the telecast.

There was general agreement that the telecasts in the series filled a very great need in their usefulness as motivation presentation, demonstration, enrichment, or culmination lessons. Little dissatisfaction with the instructional guides was apparent, insofar as their value in providing ideas for preparatory work and follow-up activities was concerned, although some feeling existed that more detail would have been appreciated by the less experienced teachers.

There were mixed reactions relative to the use of children on the television screen. However, one could sense the feeling that children should be used as little as possible, and only when absolutely necessary, since they are distracting influences.

The evaluators, and evaluating committees felt strongly that television should not be used as a means for presenting whole courses of study, or even a number of connected lessons in any one subject area. To this end, the Art Series was most successful. However, it was generally felt that, to achieve its ends, the telecast lessons should have been presented at intervals of at least four weeks, to allow the classroom teachers ample time in which to cover the necessary work, and use the telecasts in the way that best fits their needs. In this connection, it was pointed out too, that the instructional guides for the whole series should be produced and distributed as early in the school year as possible, to allow the classroom teacher an opportunity to plan their work for the year with the telecasts an integral part of their programmes.

To be most useful as a teaching aid, classroom teachers require an opportunity to preview each lesson one or two days before the actual presentation, and to re-show the telecast to the class at some later date.

Consequently, it was recommended by both evaluating committees, and many of the evaluators, that provision be made for the previewing and reshowing of the telecasts, in order to achieve the greatest benefit from this medium as a teaching aid.

Strong tribute was paid to the Teaching Aids Centre for the production of the Art Series. In spite of the very limited and inadequate conditions under which the personnel operated, the telecasts achieved a great measure of success, and compared very favourably with work of a similar nature being done elsewhere by groups having unlimited facilities, and the full time use of teachers, writers, and other personnel.

REPORT # 3 - SCIENCE

A. Introduction

Five programmes, each fifteen minutes in length, comprised the last series in the Toronto experiment. Mr. George Baker, Science Consultant for the Toronto Board of Education, did by far the major part of organizing the series, choosing the content, deciding upon the treatment, and providing the illustrative materials (both living and dead). In addition, he did the actual teaching in front of the camera.

No students were used in these programmes. Instead, Mr. Baker talked directly to each of his listeners. A great deal of related material was sent to each participating classroom, ranging from bean seeds to live baby chicks. Mr. Baker's efforts to provide an abundance of realia added greatly to the burden of preparation he had assumed so willingly.

In this connection, it is interesting to note that if the Science programmes had not been disseminated by television, the supplying of the illustrative materials would not have been possible. Since all the participating classes needed the chicks, for example, at the same time, arrangements were made for other consultants to use their cars for delivery--and, to avert tragedy, for pickup after the chicks had served their purpose.

The programmes in the Science series were as follows:

1. Wonders in a Bean Seed
2. The Animal World - Fish
3. The Animal World - Feathered Animals
4. The Animal World - Reptiles
5. The Animal World - Amphibians and Mammals

B. Dimensions of the Evaluation

The series in Science was designed to present a number of lessons for pupils in Grades III - V. Three dimensions of the medium were evaluated, viz. Physical Aspects of Reception, Pedagogy of Presentation, and Effects on Learning.

The same Evaluation Sheet was used for the Science Series as was employed for the Art and Guidance Series.

The Science Series was evaluated by 58 classroom teachers, 3 Supervisors and/or Consultants, and 11 Principals and/or Vice-Principals. In all, evaluation sheets were received from 72 evaluators.

In order to obtain further information regarding the telecasts, and to verify the statistical responses of the evaluators, two special committees were established. One was composed of a group from the Principals' Association, and the other consisted of the Consultants' Organization. A summary of their discussions and recommendations is included in this report.

C. Results of the Evaluation

1. Responses to the Questionnaire

(a) Physical Aspects of Viewing

Although the Science Telecasts were presented for Grades III - V, the largest number of viewers came from the Grades IV and V only, with 78% of the viewing groups equally divided between these two grades. Grade III classes took up another 9% of the viewing classes, and the remaining 13% was divided among the other grades of the Public Schools.

The sizes of the viewing groups varied greatly. Forty per cent of the classes consisted of 31 - 35 pupils, and 30% of the classes had from 36 - 40 pupils in them. The remaining classes had either fewer than 31 pupils, or more than 40 pupils.

Fifty-seven per cent of the viewing classes was considered by the evaluators to be of average ability, 15% was considered to be above average, 15% was rated as below average, and 13% accelerated.

A wide variation appeared in the location of the television receiver for viewing the telecasts. Half of the evaluators noted that the set had been placed at the front centre of the classroom, and one-third indicated that the set had been located at the front of the room near the window wall. The remainder of the evaluators reported that the receiver had been placed in "other locations". No consistency appeared, either, in the distance from the floor to the centre of the screen. This distance ranged from something below 46 inches to a figure above 60 inches. Since 61 out of 65 respondents indicated that the distance was satisfactory, it is difficult to ascertain which, in the opinion of the viewers, was the optimum height of the screen.

The size of the television screen varied, also. Eleven evaluators noted that a 17-inch set had been provided, 52 reported the screen to be 21 inches, and 3 indicated that a 24-inch screen had been used. As 50

replies stated that the size of the screen was adequate for all pupils and 17 reported that it was inadequate for some pupils, it must be concluded that a 21-inch screen would be the minimum requirement for satisfactory viewing.

The statistical replies relative to clarity of the picture on the screen, and the audibility of sound reception, were generally favourable. Seventy-five per cent of the viewers found the clarity of the picture to be satisfactory, and 90% considered the audibility to be adequate. The smaller groups who found some fault with both the picture and the sound placed the blame upon poor set performance, and outside interference, rather than upon the mechanics of the telecasting.

A considerable number of respondents (58) noted that some change in timetable had to be made to accommodate the classes for the viewing periods. It was indicated by 58 people reporting that the time of day had no noticeable effect upon pupil receptiveness. About 60% of the evaluators felt that adequate time had been left for immediate follow-up activities, but 40% of the replies stated that the time left for this purpose was insufficient.

(b) Pedagogy of the Presentation

Ninety-four per cent of the evaluators felt that pupil interest had been effectively aroused through the introduction to the lessons, that the goals of the lessons were made known to the pupils, and that the sequence of presentation was clear. Twenty-eight of the respondents thought that there was great stimulation of pupil thinking, and 39 felt that pupil thinking was moderately stimulated. Seventy per cent of the evaluators felt that the speed of talking of the television teacher was satisfactory, but 30% thought that he spoke too slowly for the pupils in the classrooms. Almost 90% of the reporting group felt that language used by the television teacher was satisfactory, but the remainder thought that the language was too simple. About 85% considered the new ideas and information as having been presented at a satisfactory rate, and 14% felt that it was presented too quickly. Only 1 evaluator thought that new ideas and information were presented too slowly.

All but one of the evaluators considered the length of the telecast, relative to pupil attention span, to be satisfactory. Sixty-two of the reporting group felt, too, that the weekly interval between the individual lessons of the series was satisfactory; however, 3 thought that it was too long, and 5 considered it to be too short.

There was a strong difference of opinion regarding the use of the visual materials on the screen. Sixty-five per cent of the evaluators felt that the choice of the visual material to assist the presentation was excellent, 21% considered it to be good, and 14% thought it fair. About 60% of the respondents considered the correlation between the visual materials, and the ideas expressed through words, to be excellent, 38% thought it was good and only 2% considered it fair. It was felt by 57% of the evaluators that the lack of colour on the television screen limited the effectiveness of the visual material to some extent; 17% felt that it did so significantly, but 24% thought that there was little or no significance in the lack of colour on the television screen. Insofar as the use of cameras in presenting "close-up" or "remote" shots was concerned, 23 of the 71 evaluators felt that this was excellent, and 36 considered it to be good; only 12 respondents thought that it was fair. Fifty per cent of the reporting group was of the opinion that no significant effect resulted from the compression of the visual material to the size of the television screen, but 43% thought that this compression had a limited effect, and 7% felt that it had a significant effect.

(c) Effect on Learning

Eighty per cent of the evaluating groups thought that the Science telecasts could form the basis for further work in that subject, during the period of the telecast series, to a high degree, 18% felt that it could do so to a limited extent, but only 2% felt that it could not be used at all. Some 70% of the respondents felt that the telecasts were effective in assisting later recall of information, 28% thought that it was very effective, while only 2% felt that it had no value. Eleven of the 69 evaluators seemed to feel that the novelty of this type of presentation had no significant effect upon the rate of learning, 33 felt that it had some effect, but 25 thought that it had a marked effect.

Some problems in discipline were evident during the telecasts. Restlessness and attention wandering were noted in 18 of the replies, while 5 respondents indicated pupils distracting other pupils, as a problem. There was one reference to uncontrollable excitement and talking back to the television teacher, and 6 problems listed as "other".

(d) Summation of Written Comments

In the evaluation questionnaire, eight further areas were explored through the use of questions of a more general nature. The replies formed some common pattern of opinions, suggestions, and recommendations; these are outlined as follows, with the original question stated in each case:

Question 1: "INDICATE IDEAS OR MATERIALS PRESENTED DURING THE TELECASTS WHICH COULD NOT ORDINARILY HAVE BEEN PRESENTED IN A REGULAR LESSON."

Thirty of the evaluators felt that the use of rattlesnakes, skeletons, etc., as teaching aids would not have been possible in the average classroom situation. Few teachers would have been able to procure this material, and, if they had, they would have been ill-prepared to handle the material properly.

Two evaluators mentioned the fact that, through the use of television, whole classes, rather than a few students at a time, were able to see the specimens, etc., adequately on the screen. In four evaluation sheets, it was pointed out that the time-lapse photography in the germination of the bean seed made use of a technique difficult for teachers to duplicate.

Three respondents levelled the criticism that no ideas or materials were presented which could not have been ordinarily presented in a classroom situation. However, a like number countered that, even if the materials had been present, few classroom teachers would have been able to undertake the research and organization necessary for a successful lesson.

Question 2: "INDICATE ASPECTS OF THE VISUAL MATERIALS, OR THEIR USES, WHICH TENDED TO DISTRACT PUPILS FROM THE PRESENTATION."

Thirty-three evaluators indicated that no distractions were caused by the visual materials, or their uses. However, it was pointed out by at least five respondents that the noises and antics of the feathered animals excited the class, and created a great amount of distraction, leading, at time, to an almost complete disregard for the lesson proceeding on the screen. It was pointed out, also, in three evaluation sheets, that insufficient time was allowed for the pupils to examine the samples on their desks, particularly in the case of the bean seeds and feathers, and that this lack of time resulted in a form of

frustration, and disinterest. Two evaluators raised the point that too many new ideas were presented in a lesson, and that children were still studying the picture on the screen when a new concept and picture were suddenly introduced. Three of the evaluators pointed out that the signs on the screen were not always readable, and hence distracted the pupils from the viewing.

One evaluator felt that the materials added so much interest to the lessons, that there was no opportunity for the pupils to become distracted.

Question 3: "INDICATE WAYS BY WHICH THE CLASSROOM TEACHER EXPANDED ON THE LESSONS BEYOND THOSE DEVELOPED IN THE TELECASTS."

Sixty-five of the evaluation sheets listed ways by which the classroom teachers expanded on the concepts presented during the telecast lessons. In many instances, the lessons were followed by trips to the zoo and the museum, the writing of reports, further discussions, reading, and observation. A number of projects, including the making of charts, models, graphs, and drawings was also undertaken in the classrooms. Special notebooks were compiled, and some children took on the task of caring for the living specimens in the classroom. One teacher used the telecasts as the basis for correlated activities in Arithmetic, Spelling, Language, and Social Studies.

Question 4: "INDICATE MEANS BY WHICH PUPILS SOUGHT OUT ADDITIONAL INFORMATION RELATED TO THE TOPICS PRESENTED IN THE TELECASTS."

Twenty-five evaluation sheets listed methods by which the pupils sought out additional information. These included the use of encyclopaedia and reference books, supplementary reading, and the making of picture collections. Some pupils undertook to start bean seeds at home, and report on their observations.

Question 5: "IF INSTRUCTIONAL GUIDES HAD BEEN SENT OUT PREVIOUS TO THE TELECAST SERIES, INDICATE:"

(a) "THEIR EFFECTIVENESS IN PREPARING THE PUPIL FOR THE LESSONS."

Only forty-six of the evaluators commented on the effectiveness of the instructional guides in preparing pupils for the lessons. All but one of these evaluators found the guides to be generally helpful in arousing class interest, pre-teaching some of the concepts, and telling the pupils what to look for. The suggested blackboard drawings were considered to be useful.

(b) "THEIR EFFECTIVENESS IN PLANNING FOLLOW-UP ACTIVITIES."

Few comments were received relative to the effectiveness of the guides in planning follow-up activities, and the consensus of opinion was that the guides gave the classroom teachers many ideas for expanding on the concepts presented during the lessons.

(c) "HOW THESE GUIDES, ETC., MAY HAVE BEEN IMPROVED."

About thirty evaluators commented on this question, and twenty-one of the thirty found no fault with the guides; they considered them to be excellent, good, or satisfactory. Eight respondents suggested that more detailed information could have been forthcoming, and three stated that they would have appreciated more diagrams and illustrations. Two of the evaluators felt that the guides should have come out well in advance of the telecasts.

One evaluator recommended that the guides should inform the classroom teachers how and where to obtain specimens and samples, and how to care for living things both before and after the telecasts.

There was one comment that the guides had too much material, and called for too much pre-teaching, leading to a lack of interest during the telecasts.

Question 6: "INDICATE DIFFICULTIES ENCOUNTERED BY THE CLASS RELATIVE TO THE SATISFACTORY VIEWING OF TELECAST LESSONS, E.G. SEATING ARRANGEMENTS, POSTURE, EYE STRAIN, PUPIL FATIGUE, ETC."

In twenty-nine of the seventy-two evaluation sheets, no comments were made regarding this question. However, among the remainder of the evaluation sheets, reference was made to poor types of furniture encountered in some of the viewing rooms (benches, chairs) which tended to affect posture and create eye strain, to over-sized viewing rooms which placed some children too far from the screens, and to crowded viewing conditions, which placed some pupils in an uncomfortable condition. In a number of instances, comments were made that many pupils had to view the screen from an awkward angle, and saw a distorted picture.

(b) "INDICATE MEANS BY WHICH THE DIFFICULTIES MIGHT HAVE BEEN OVERCOME."

The consensus of opinion among the people who replied to this question indicated that, if adequate furniture and viewing conditions had been provided, or a special viewing room set up, the difficulties noted in (a) would have been overcome.

Question 7: "INDICATE YOUR VIEWS RELATIVE TO THE GENERAL VALUE OF T.V. IN COMPARISON WITH WHAT COULD HAVE BEEN DONE WITH A SIMILAR EXPENDITURE OF MONEY AND TIME, E.G. SUBJECT CONSULTANTS, FILM LIBRARIES, BOOKS AND MATERIALS FOR CLASSROOM USE, ETC."

Although most of the evaluators wrote in reply to this question, only about forty of the comments had any direct bearing on the question itself. Ten of the evaluators stated that the expenditure could well have been directed towards the supplying of live specimens, films, film strips, and reading materials. Five of the respondents felt that, while films and consultants would have done as good, or better a job, these resources are not always available when the teacher wanted them.

Among eight of the evaluators there was a common pattern of thought that the telecasts compared favourably with films.

Question 8: "IN YOUR VIEW, WHAT EFFECTS ARE THERE ON LEARNING AS A RESULT OF THE ABSENCE OF THE TWO-WAY PROCESS IN THE TELECAST PRESENTATION."

There were about fourteen comments that no effects resulted from the absence of the two-way process, if the classroom teacher did an adequate amount of preparation and follow-up activities to the telecasts. Seven evaluators felt that there was some effect, but failed to elaborate upon their views. Twenty of the respondents stated that there was a significant effect, since the children forgot their questions by the time the telecast ended.

Three evaluators felt that this form of presentation could result in lazy listening habits, and a loss of the feeling of achievement on the part of the pupils.

There were two comments that the absence of the two-way process had some advantage, in that the pupils were trained to listen, and retain information.

Question 9: "OTHER COMMENTS."

Only seventeen comments were forthcoming in this section of the questionnaire. However, many of these comments were covered in other parts of the evaluation sheet, and, therefore, are not included here.

Among the remainder of the comments, a number must be mentioned. Two respondents felt that the telecasts had a definite place in the class

programmes, and should be continued. One evaluator felt that the classroom teacher should have an opportunity to preview the telecasts, in order to be in a better position to use them to advantage. It was noted in two comments that the telecasts do as much for the teachers as they do for the pupils.

The fear was stated, by one evaluator, that too much use of telecasting could result in the television instructors becoming technologists.

Tribute was paid to the fine work done by Mr. Baker, the Television Teacher. On more than one occasion the classes viewing the telecasts broke into spontaneous applause at the conclusion of the lessons.

2. Report of Special Committees

(a) Principals' Association

An evaluation committee, composed of members of the Public School Principals' Association, discussed the Science Telecasts, and made a number of pertinent comments and recommendations.

(i) Pedagogy of Learning and Television

The group was well impressed with the overall value, and effect of the Science Series. It was felt that both teachers and pupils benefited greatly from the actual presentations, that thinking was stimulated, and that motivation was provided for further study of the concepts presented during the lessons. The in-service value of the telecasts did not end with the individual teachers and classes who viewed the telecasts, for in many instances the interest spread to classes which did not receiver the telecasts.

Some concern was indicated by the group, however, that there was a tendency to present too many new concepts in each lesson of the series, and that the lessons were too closely spaced, leaving little time for the pupils to absorb all the ideas offered, or for full-scale follow-up activities to be undertaken. It was also felt that the asking of too many questions by the television teacher presented an unnatural situation which led to some confusion and frustration on the part of the pupils who were, in effect, unable to offer answers to the questions.

There was some discussion regarding the question of children making notes during the telecasts. It was felt that this should be neither encouraged nor discouraged, for it would depend upon the ability of the individual classes to do this activity. The extent to which the

room had to be darkened to facilitate viewing would also dictate the scope of the note-making. There was agreement among the members of the committee that note-making during a telecast could be very distracting, if it were over-emphasized. The consensus of opinion among the group was that, if note-making were to be done during the telecasts, the notes should be as brief as possible, and only in the category of headings.

The group did not feel that instructional guides or work sheets should be distributed to the pupils for use during the telecasts. It was felt that this would divide the attention of the viewers, and be a very distracting influence.

Some members of the committee pointed out that often too much time had to be spent in preparing the classes for the telecasts, and that this encroached upon the time devoted to the other subjects of the curriculum.

(ii) Use of Visual Materials

The committee felt very strongly that some uses of the visual materials proved to be ineffective. Unsuitable background reduced the contrast of black and white, and made some of the visuals, particularly the title cards, difficult to see. Small objects required considerable enlargement to be effectively visible to all the students, and the title cards themselves require better placement to prevent their being cut off from view.

(iii) Large-Group Instruction

The members of this committee indicated their belief that large-group instruction would be more profitable at the high school and college levels, than at the elementary school levels.

(iv) Future Plans for Television

The evaluation committee was of the unanimous opinion that continued experimentation with this medium be conducted, and put forth the following recommendations for consideration:

1. That committees be established to plan, check and evaluate the lessons, before they are telecast.
2. That the lessons be better spaced, with a view to providing more time between the individual lessons of a series.
3. That a preview of the forthcoming lessons be sent to the schools well in advance of the telecasts, to allow the classroom teachers an opportunity to determine how these lessons might best suit the pupils' needs as motivation, presentation, or follow-up material.

4. That the television committees prepare a careful list of the materials required by the classroom teachers for use in conjunction with the telecasts and that this list be forwarded to the schools in order that the necessary materials may be requisitioned.
5. That television sets and adjustable dollies be purchased for each school building.
6. That the lessons in Science be geared to one particular grade, rather than to a division.

(b) Consultants' Organization

The members of the Consultants' Organization, constituting an evaluation committee, made many important observations regarding the Science Telecasts, and submitted a number of recommendations for consideration.

(i) Pedagogy of Learning and Television

The group was impressed with the telecasts as a medium for in-service and teacher training, through its impact on the classroom teachers. Teachers learned new methods of lesson organization and presentation, how to use concrete materials to the greatest advantage, and how preparation and follow-up activities are vital for the success of any lesson.

There was some feeling that the guide sheets were too detailed, insofar as lesson preparation was concerned, and that, where teachers conscientiously followed the plans, little new material appeared to be presented during the telecasts. However, it was pointed out that the instructional materials generally proved to be excellent guides, and were of great value to both the experienced and inexperienced teachers.

A fear was expressed that over-direction in the instructional guides could result in too much "sameness" in note books, projects, displays, etc., from class to class, leading to a stereotyping of activities, and a reduction and lessening of teacher initiative and resourcefulness.

Great concern was felt that too much was attempted in each telecast lesson, and that the weekly interval between telecasts left little time for adequate follow-up activities. The opinion was expressed that each lesson in itself could have been used as the basis for, or culmination to, an extended unit of studies in the class science programme.

Little fault was found with the questioning technique of the television teacher. The consensus of opinion was that the questions stimulated thought, directed attention, and provided the pupils with a sense of participation. It was felt that, through careful follow-up activities, the pupils would have the answers to the questions discussed, and, therefore, lose little, if anything, from the learning process.

It was the opinion of the group that instructional guides and work sheets need not be provided to the students for use during the telecast lessons, as they can lead to considerable distraction. However, it was felt that children should be permitted to jot down clue words during the telecasts, as an aid for recalling information.

There was no criticism of the fact that the lessons were presented to a division, rather than to a particular grade level. The committee felt that, where the lessons were directed to a division, the classroom teacher could use only those telecasts which bore directly upon the needs of the class. If the classroom teacher elected to use all of the telecasts, she could adjust the suggestions for preparatory and follow-up activities to meet the level of the class.

There was the unanimous opinion expressed that the pupils gained much from the telecasts, and displayed a high degree of interest in the lessons. This was attributed to the selection and use of the concrete materials, and the techniques of the television teacher. It was pointed out, however, that pupil interest and learning could vary in proportion to the amount of preparation and follow-up undertaken by the classroom teachers, and that this fact was evident in a number of instances.

(ii) Use of Visual Materials

A number of areas of concern was noted by the group, relative to the use of the visual materials. It was stated that there was a significant loss in effectiveness through the absence of colour on the screen, that more close-up shots would have made many of the objects appear larger, and hence more discernable, and that pains should have been taken to prevent portions of the flash-cards from being cut off from view.

Some members of the committee felt that the printing on the flash-cards differed from the classroom approach to printing, with an adverse effect on the pupils. However, this point did not have sufficient support to make it appear significant.

(iii) Future Plans and Recommendations

The members of the Consultants' Organization felt that considerable value had been gained from the series of science telecasts, both by the pupils and the teachers, and that future experimentation take place. After careful study and discussion, the following recommendations were made:

1. That television be used during classroom time for such general subjects as Science, Social Studies, Health, Safety, and some aspects of the Language Arts, and not for the presentation of skill subjects.
2. That connected series of lessons in any one subject be avoided, and that lessons of a specific nature be produced, and telecast at intervals of one every four to six weeks.
3. That committees of teachers, consultants, supervisors, and principals be established to work with the programme convenor, script writer and television teacher, to determine the topics to be presented in the telecasts, and to outline the material to be presented in each lesson.
4. That each telecast be viewed by a pilot group, before it is widely telecasted, to determine its effectiveness in presenting the lesson material.
5. That classroom teachers receive in September a schedule of the telecasts for the year, and some indication of the nature and format of each telecast.
6. That instructional guides, containing some suggestions for preparatory work and follow-up activities, and a synopsis of the lessons, be prepared and distributed well in advance of the telecasts.
7. That a study be made of ways of projecting the television picture onto a larger screen.
8. That the use of Social Studies, as one of the subjects for telecasting, be explored for the next school year.
9. That the present series of Art and Science lessons be re-telecast during the next school year, for classes which did not receive the telecasts in the current school year.
10. That a time earlier than 11:30 a.m. be used for the showing of the telecast lessons.
11. That for optimum value, telecasts should be viewed by one class in its own classroom setting.

12. That an experiment be undertaken in the use of television as an in-service and teacher-training medium, by producing lessons in the skill subjects, for telecasting to the schools between the hours of 3:30 and 4:30 p.m.

D. Overview of the Science Series

The Science Series, produced for Grades III - V, consisted of five telecast lessons of fifteen minutes' duration each. The first lesson, individual in nature, was entitled "Wonders in a Bean Seed", and the other four lessons, forming a connected series, was "The Animal World". The use of a connected series of lessons was undertaken to ascertain the relative merits of this form of presentation.

In spite of the fact that the Science Series, like the series in Guidance and Art, was produced within a limited amount of time, with the minimum of facilities and equipment, and with no clear-cut pattern to follow, no serious criticism was raised insofar as the techniques of production and telecasting were concerned. Some feeling did exist that the visual material suffered through the lack of colour on the television screen, but this evidence was only subjective, and opinion was divided relative to the degree of ineffectiveness that resulted. Other faults, minor in nature, will no doubt be rectified as the technical staff gains more experience with this medium of television.

There was general satisfaction among the evaluators relative to the value, for teachers and pupils, that accrued from the telecasts. Techniques and materials were presented, which could not ordinarily have been presented in a normal classroom situation, and thus the in-service value was great. The lessons did much towards stimulating interest among the students, and motivating activities well beyond the telecasts themselves. Thus, a number of dimensions of television as an educational medium was fulfilled.

While it was felt in some areas that learning suffered through the absence of the two-way process during the telecasts, there was no conclusive evidence to support this feeling. There was a strong body of opinion which stated that, where adequate preparatory and follow-up activities were conducted by the classroom teachers, little, if any, loss resulted from this inability of the students to question the television teacher.

There was considerable evidence to support the view that questions raised by the television teacher, during the telecasts, were most advantageous, in that they stimulated thinking, and gave the pupils a feeling of active participation in the lessons. However, there was a general feeling that too many questions were presented in each telecast. This had an adverse effect, in that many students were unable to keep abreast of the new ideas and concepts which were being offered in the lessons.

The length of the telecasts appeared to be adequate and satisfactory. The evaluators were strongly of the opinion, though, that the 11:30 time of the telecasts was poor from every point of view. It brought the telecasts too close to the lunch periods, and left little time for immediate follow-up activities, so necessary for any teaching aid to be effective. There was a very strong recommendation that future telecasts be presented at a time earlier than 11:30, to allow at least twenty minutes for immediate follow-up activities.

The evaluators were satisfied with the quality of the instructional guides, and the suggestions given for preparatory and follow-up activities. However, suggestions were made that these guides should have contained some information relative to the obtaining of specimens for use in the classrooms during the telecasts, and the methods of caring for the live specimens both before and after the lessons themselves.

Dissatisfaction existed with both the weekly interval between the lessons of the series, and with the use of related lessons to form a complete unit of study. It was found that the weekly interval left little time for follow-up, reteaching, review, and enrichment activities for the one lesson, and preteaching and preparation for the coming lesson. It was also felt that presentation of a number of related lessons in a series could result in a stereotyping of teaching methods, lesson presentation, demonstration techniques, etc., and thus reduce teacher initiative and resourcefulness. Consequently, it was recommended that lessons in any subject area be individual in nature, and telecast at intervals of from four to six weeks.

To assist teachers in making the greatest use of telecast lessons as part of the instructional programmes, it was recommended that a schedule of telecasts, listing dates, subjects, and topics of the telecasts, be distributed in September, to enable the classroom teacher

to integrate the lessons with the programme of studies according to their needs. It was also recommended that, well in advance of the telecasts themselves, guides containing synopses of the lessons, suggestions for preparatory and follow-up activities, bibliographies, etc., be supplied to the teachers.

Although there was general satisfaction with the instructional guides for the Science Series, some disappointment was evident that the classroom teachers were unable to preview the telecasts, or reshow them to the class as review lessons. It was recommended by both evaluation committees, and by the majority of the individual evaluators, that each telecast be presented on more than one occasion, once for the teachers to preview, once for initial class presentation, and once for follow-up or review. Should it be impossible to provide for the three showings, at least the two classroom showings would appear to be most necessary.

For future telecasting, it was recommended by the evaluation groups that committees, composed of principals, supervisors, consultants and classroom teachers be established to work with the programme producers, script writers, and television teachers concerned with the preparation of the lessons to be telecast. It was also recommended that the completed films of the lessons be shown to these committees, and to pilot classes, for evaluation and possible alteration, before mass telecasting is undertaken.

The responses of the evaluators, and the comments of the evaluating committees, indicated that, due attention must be paid in future telecasting to the physical aspects for viewing the telecasts in a normal classroom situation, in order to reduce to a minimum the number of distractions and interruptions, and to secure the maximum amount of receptiveness and rapport on the part of the students. It was recommended that one television receiver, of good quality, be provided per school building, that this receiver be placed on a movable, adjustable stand, and that hoods be provided for the screen in order to eliminate glare and facilitate viewing.

Many comments, of a congratulatory nature, were made by the evaluators, and directed towards the personnel of the Teaching Aids Centre who so ably produced the lessons, in spite of limited time and

inadequate facilities. Of the criticisms made by the evaluators, few reflected the inexperience of the technical staff with this new medium, and revealed only some of the shortcomings of television as an instructional medium as a whole.

It was the considered opinion of both evaluating committees, and many of the evaluators, that experimental work in televised instruction be continued, and that the many recommendations incorporated into this Report be considered, and adopted, where necessary.

REPORT # 4 - CLOSED CIRCUIT EXPERIMENT

Introduction

Much has been heard about the future role of television as a teaching aid in the schools, and opinions regarding its potentialities have ranged from one extreme to the other. In the main, these opinions have not been supported by evidence, and many of them seem merely to have reflected the prejudices of the individuals expressing them.

From the point of view of learning, it has been argued that colour films, because of their size and colour, have a greater impact on the student than television. Some studies have, in fact, demonstrated differences in retention between colour and black-and-white films, but the evidence is by no means conclusive. Other studies have suggested that the use of colour may, in certain cases, actually distract attention from the stimuli that are to be absorbed. This may well be the case when the material being presented is of a factual, and not artistic or aesthetic nature, since reactions to colour seem to be emotional and not rational. This fact has, of course, been noted with profit by market researchers, advertisers and food packers. It has also been suggested that, beyond a certain optimum point, increased size of a projected image may not facilitate learning. Obviously, there is a certain limited range of image beyond which learning will be inhibited.

In Reports Nos. 1 to 3, subjective evaluations of the Toronto Telecast series were given, but no objective evaluation of the effect of the telecasts on learning was available. This study is an attempt to determine the differential effects on retention of black-and-white television and colour film presentation.

The four guidance films from the Toronto Telecast series were used. It was felt that objective tests on the content of these would be less likely to be influenced by previous learning than the films on regular academic subjects. These guidance films covered a wide range of occupations and were entitled as follows:

(a) The Provincial Institute of Trades
(b) The Ryerson Institute of Technology
(c) The Hospital Team
(d) Path to University.

It was thought that by covering such a wide range of occupations, any differences due to specific interest in 'favoured' occupations, whether due to socio-economic or sex differences in the students, would tend to be eliminated.

Procedure

Apparatus

The colour films were shown both on an ordinary film screen, which measured 5' x 5'6", and over the closed-circuit television system. The television sets had 21-inch screens and, of course, showed the films in black-and-white. Thus, the only difference to the students viewing either the telecast or the film was that one group was learning through a projected film in colour and on a large screen, while the other group learned through the same film projected through a 21-inch television receiver. The films each ran for fifteen minutes.

Subjects

Nine classes of Grade IX students at Riverdale Collegiate Institute were divided into four groups, equated on I.Q., educational achievement and sex, as follows:

(a) Recall group (n = 27), consisting of one class which saw the regular Toronto Telecasts in January. This group was unaware, at the time, that it would be tested at a later date.

(b) Film only group (n = 64), consisting of three classes which saw the colour film on the screen described above.

(c) Television only group (n = 77), consisting of three classes which saw the films over the closed-circuit television screens, in black-and-white.

(d) Both film and television group (n = 49), consisting of two classes which saw both the colour film and the closed-circuit television presentations in quick succession.

Method

Twenty questions of a multiple-choice type, (four alternatives), were made up for each of the four films. The test for each film was administered twice to groups 2, 3 and 4, i.e., immediately prior to, and immediately after the groups were exposed to their respective presentations. Each test was administered only once to the Recall group, at the time of the post-testing of the other groups. The films were shown at regular weekly intervals, beginning on April 25, 1960. In addition to the

objective tests, written opinions of the films and manner of presentation were obtained from the students.

Results

Mean Scores on all four tests (maximum possible score = 80).

		Pre-Test	Post-Test	Increase
Recall group	1		36.0	
Film only group	2	28.0	48.0	20.0
Television only group	3	25.5	46.9	21.4
Both Film and Television group	4	24.0	53.4	29.4

1. Statistical analysis of the mean increase scores showed that no differences existed between the film only and television only groups, either on all the tests combined, or on any of the individual tests. As expected, the group which saw both film and television scored consistently and significantly ($p<.01$) higher than the groups that saw only one presentation, on all four tests.
2. An overall analysis of the pre-test scores of groups 2, 3 and 4 showed that differences existed ($p<.05$). A more detailed analysis revealed that this difference existed on only one of the tests, namely, the Ryerson Institute of Technology.
3. All four groups were compared, by statistical means, on post-test scores. The group which saw both film and television scored significantly higher ($p<.01$) than all other groups. The Recall group scored significantly ($p<.01$) lower than all other groups. There were no differences between the film only and television only groups.

Conclusions

All the results of the analyses of the mean increase scores (measured by taking the differences between pre- and post-test scores) indicated quite consistently from test to test, that the black-and-white telecast is as effective for the retention of factual material as the larger screen colour presentations. Thus, it would seem that increased size, where it is not specifically related to a need, as for example in the presentation of charts, etc., and the use of colour, where it is not relevant to the material being presented, do not facilitate learning significantly.

Since the main measure of the study was the average increase in score resulting from exposure to colour film or black-and-white telecast, it was felt that any differences in pre-test scores would not necessarily invalidate the results. However, as mentioned above, the groups were equated and no pre-test score differences were expected. The overall difference in pre-test scores was due only to differences in one of the four tests, that on the Ryerson Institute of Technology. This may merely reflect chance differences in knowledge of this particular area and not differences in general educational and I.Q. levels. This contention is supported by the fact that no differences existed in overall analysis, or in this particular film in the post-test scores of the television only and film only groups. If an actual difference between the film and television only groups on pre-test scores existed, the disappearance of this discrepancy on the post-test scores could only be explained by the superiority of one of the methods of presentation. It has already been demonstrated that this is not the case, and therefore the isolated pre-test difference must be attributed to chance.

It is interesting to note that retention of material viewed on the telecasts seems to hold up well with the passage of time. The Recall group, which was tested twelve weeks after viewing the telecasts, retained approximately:

77% as much as the television only group,
76% as much as the film only group, and
68% as much as the film-and-television group,

all of which were tested immediately after viewing. In addition, these latter groups had the advantage of taking the same test prior to viewing, thus having the opportunity to form a learning 'set'.

APPENDIX I

TELEVISION STUDY ORGANIZATION

I CO-ORDINATING COMMITTEE:

W. B. Adams - Chairman
J. R. H. Morgan
T. H. W. Martin
D. S. Mewhort
(Chairman of Sub-Committees co-opted as required)

II SUB-COMMITTEES: (Chairman's name is underlined)

a. Research and Evaluation
(P. Hornick, J. Hermon Couke, Sinclair Hemingway, W. B. Adams, A. R. MacKinnon)

1. Make precis of published reports, books, etc.
2. Obtain first-hand evaluations of current experiments.
3. Prepare survey of existing teaching aids, showing relative advantages and disadvantages of each.
4. Prepare evaluation forms for Toronto programmes and evaluate results.

b. Facilities and Equipment
(C. E. Freestone, Graham M. Gore, G. W. T. Ledger, Walter Diak)

1. Investigate possibilities of using facilities of CBC and Ryerson Institute.
2. Check on costs involved in setting up a closed-circuit system linking the classrooms in a building and the schools in the Toronto school system.
3. Check on costs of establishing a transmitter for use by the Toronto schools.
4. Compare the relative advantages of video tape, kinescopes, or advance filming.
5. Investigate cost of receivers, antenna systems, etc.

c. Programming
(J. Hermon Couke, G. W. Varty, A. D. Sparks, Gordon Stewart, Richard Gooday, Wm. A. McLaughlin, Howard Dierlam)

1. Analyse topics on Courses of Study and locate those which are best treated by TV.
2. Summarize programme types that could be used locally.
3. Select subjects and topics that might be included in an experimental TV series.
4. Plan an experimental series.

d. Production and Utilization
(M. K. MacDonald, Harold B. Dean, H. Neil Nelson, W. B. Adams, C. E. Freestone, Moira Armour)

1. Locate teachers who can perform satisfactorily before the camera, or who can be trained to do so.
2. Plan a Workshop course designed to give prospective TV teachers sufficient experience to make them feel at home before the camera.
3. Plan a similar Workshop to give teachers instruction in how to use TV in the classroom.

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III SPECIAL COMMITTEES:

a. Special Committee - Guidance
(John Johnston, Richard Gooday, Mrs. Eileen Gladman, Percy Douglas)

1. Provide, through informed discussion, a check on answers made to the evaluation questionnaire.
2. Suggest directions for future work with television.

b. Special Committee - Art and Science Series
(Principals' Association - Vincent Hudgins, S. G. Ellison, Mary Thomas, W. Lorne Mortson, Audrey Faulkner, Melvin D. McLean)

1. Provide, through informed discussion, a check on answers made to the evaluation questionnaire.
2. Suggest directions for future work with television.

c. Special Committee - Art and Science Series
(Members - Consultants' Organization)

1. Provide, through informed discussion, a check on answers made to the evaluation questionnaire.
2. Suggest directions for future work with television.